

INTERNATIONAL COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
ANTHONY D. LOGAN
ELLIS & VENABLE PC
101 NORTH FIRST AVENUE, SUITE 1875
PHOENIX, AZ 85003

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference PHLV0650-007	Date of mailing (day/month/year) 31 JAN 2005 FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US04/33109	International filing date (day/month/year) 07 October 2004 (07.10.2004)
Applicant H. SPENCER	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: +41 22 740 14 35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/ US
Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (703) 305-3230

Authorized officer

Matthew O Savage

Telephone No. (571) 272-1101

(See notes on accompanying sheet)

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference PHLV0650-007	FOR FURTHER ACTION <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. PCT/US04/33109	International filing date (<i>day/month/year</i>) 07 October 2004 (07.10.2004)	(Earliest) Priority Date (<i>day/month/year</i>) 07 October 2003 (07.10.2003)
Applicant H. SPENCER		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the Report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. 1.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (See Box No. III)

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 2

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☒ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/33109

Box IV TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

NEW ABSTRACT

This invention provides methods and apparatus for treating a batch contaminated resource using an ultrasonic pressure wave. A method of treating a batch contaminated resource is described comprising the steps of introducing at least one oxidizing agent into the batch contaminated resource; and energizing the batch contaminated resource and the at least one oxidizing agent with an ultrasonic pressure wave; and an apparatus is described for treating a batch contaminated resource using at least one transducer (300) in a transducer housing (320) to produce ultrasonic pressure waves in the batch contaminated resource wherein the transducer housing is inside a container (200) and an energy source for energizing the at least one transducer is coupled to the at least one transducer (300).

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/33109

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B09C 1/08

US CL : 210/748, 759, 760; 405/128.5, 128.5; 588/304; 366/127

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 210/747, 748, 759, 760, 765; 405/128.5, 128.75; 588/304; 366/127

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,597,265 A (Gallo) 28 January 1997 (28.01.1997), see from line 49 of column 2 to line 30 of column 3).	1-6, 12, 13, 15-20, 23, 25, 29, 30, 34-39, 45, 46, and 48-53 ----- 7-11, 14, 21, 22, 40-44, 47, 54, and 55
Y	US 2003/0133755 A1 (RHEE) 17 July 2003 (17.07.2003), see paragraphs 10-27.	7-11, 14, 21, 22, 40-44, 47, 54 and 55
A	US 5,198,122 A (KOSZALKA et al) 30 March 1993 (30.03.1993), see from line 8 of column 3 to line 15 of column 4.	1-55



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

14 January 2005 (14.01.2005)

Date of mailing of the international search report

31 JAN 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

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Alexandria, Virginia 22313-1450

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Authorized officer

Matthew O Savage

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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101 NORTH FIRST AVENUE, SUITE 1875
PHOENIX, AZ 85003

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing
(day/month/year)

31 JAN 2005

FOR FURTHER ACTION

See paragraph 2 below

Applicant's or agent's file reference

PHLV0650-007

International application No.

International filing date (day/month/year)

07 October 2004 (07.10.2004)

Priority date (day/month/year)

07 October 2003 (07.10.2003)

PCT/US04/33109

International Patent Classification (IPC) or both national classification and IPC

IPC(7): B09C 1/08 and US Cl.: 210/748, 759, 760; 405/128.5, 128.5; 588/304; 366/127

Applicant

H. SPENCER

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/US04/33109

Box No. 1 Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International appl. No.
PCT/US04/33109

Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)

Claims Please See Continuation Sheet YES
Claims Please See Continuation Sheet NO

Inventive step (IS)

Claims Please See Continuation Sheet YES
Claims Please See Continuation Sheet NO

Industrial applicability (IA)

Claims Please See Continuation Sheet YES
Claims Please See Continuation Sheet NO

2. Citations and explanations:

Please See Continuation Sheet

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International Publication No.
PCT/US04/33109

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V.1. Reasoned Statements:

The opinion as to Novelty was positive (Yes) with respect to claims 7-11, 14, 21, 22, 40-44, 46, 47, 54, and 55
The opinion as to Novelty was negative (No) with respect to claims 1-6, 12, 13, 15-20, 23, 25, 29, 30, 34-39, 45, 46, and 48-53
The opinion as to Inventive Step was positive (Yes) with respect to claims 24, 26-28, and 31-33
The opinion as to Inventive Step was negative (NO) with respect to claims 1-23, 25, and 29-30, and 34-55
The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-55
The opinion as to Industrial Applicability was negative (NO) with respect to claims NONE

V. 2. Citations and Explanations:

Claims 1-6, 12, 13, 15-20, 23, 25, 29, 30, 34-39, 45, 46, and 48-53 lack novelty under PCT Article 33(2) as being anticipated by Gallo.

With respect to claim 1, Gallo discloses introducing an oxidizing agent (e.g., hydrogen peroxide, see lines 49-64 of col. 2) into the batch contaminated resource and energizing the batch contaminated resource and the oxidizing agent with an ultrasonic pressure wave 42 (see FIG. 3 and lines 21-30 of col. 3).

As to claim 2, Gallo discloses a transducer (e.g., the ultrasonic generator described on lines 21-30 of col. 3).
Concerning claims 3 and 4, Gallo discloses the oxidizing agent as being introduced as a aqueous solution (see line 62 of col.

2).
Regarding claims 5 and 6, Gallo discloses the solution as permeating or flowing through the batch contaminated resource (see from line 66 of col. 1 to line 7 of col. 2).

As to claim 12, Gallo discloses hydrogen peroxide (see line 62 of col. 2).

Regarding claim 13, Gallo discloses the batch contaminated resource as having a boundary (e.g., a surface of the resource) and placing the transducer adjacent to the boundary (see FIGS. 2 and 3).

With respect to claim 15, Gallo discloses arranging a transducer 20, 30, 40 in a batch contaminated resource 10, introducing an oxidizing agent into the resource, energizing the resource and agent, the transducer producing ultrasonic pressure waves to energize the resource and oxidizing agent.

Concerning claim 16, Gallo discloses a unidirectional ultrasonic pressure wave 22 (see FIG. 1).

Regarding claims 17 and 18, Gallo discloses a multi-directional ultrasonic pressure wave 42 capable of producing a uniform wave (see FIG. 3).

As to claim 19, Gallo discloses arranging the transducer adjacent a boundary of the resource (e.g., the boundary being a surface of the resource).

Regarding claim 20, Gallo discloses placing the transducer within a volume of the resource (see FIGS. 2 and 3).

With respect to claim 23, Gallo discloses a transducer 20 in a transducer housing (see FIG. 3) and a container 12 having an inside and outside with the transducer housing being in the inside, and an energy source coupled to the transducer to produce ultrasonic waves (see lines 21-30 of col. 3).

Regarding claim 25, Gallo discloses the transducer as having a shaft (see FIG. 3).

Concerning claims 29 and 30, Gallo discloses an oxidizing agent introducing device 12 including an impermeable material and inlets 14 (see FIG. 3).

With respect to claim 34, Gallo discloses adding a binding agent (e.g., the catalyst described on line 62 of col. 2), introducing an oxidizing agent (e.g., hydrogen peroxide, see lines 49-64 of col. 2) into the batch contaminated resource, and energizing the batch contaminated resource and the oxidizing agent with an ultrasonic pressure wave 42 (see FIG. 3 and lines 21-30 of col. 3).

As to claim 35, Gallo discloses a transducer (e.g., the ultrasonic generator described on lines 21-30 of col. 3).

Concerning claims 36 and 37, Gallo discloses the oxidizing agent as being introduced as a aqueous solution (see line 62 of col.

2).
Regarding claims 38 and 39, Gallo discloses the solution as permeating or flowing through the batch contaminated resource

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International Application No.
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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

(see from line 66 of col. 1 to line 7 of col. 2).

As to claim 45, Gallo discloses hydrogen peroxide (see line 62 of col. 2).

Regarding claim 46, Gallo discloses the batch contaminated resource as having a boundary (e.g., a surface of the resource) and placing the transducer adjacent to the boundary (see FIGS. 2 and 3).

With respect to claim 48, Gallo discloses adding a binding agent (e.g., the catalyst described on line 62 of col. 2), arranging a transducer 20, 30, 40 in a batch contaminated resource 10, introducing an oxidizing agent into the resource, energizing the resource and agent, the transducer producing ultrasonic pressure waves to energize the resource and oxidizing agent.

Concerning claim 49, Gallo discloses a unidirectional ultrasonic pressure wave 22 (see FIG. 1).

Regarding claims 50 and 51, Gallo discloses a multi-directional ultrasonic pressure wave 42 capable of producing a uniform wave (see FIG. 3).

As to claim 52, Gallo discloses arranging the transducer adjacent a boundary of the resource (e.g., the boundary being a surface of the resource).

Regarding claim 52, Gallo discloses placing the transducer within a volume of the resource (see FIGS. 2 and 3).

Claims 7-11, 14, 21, 22, 40-44, 47, 54, and 55 lack an inventive step under PCT Article 33(3) as being obvious over Gallo in view of Rhee.

With respect to claims 7 and 40, Gallo fails to specify removing the oxidizing agent. Rhee discloses removing the oxidizing agent and teaches that such a step permits continuous contact of the contaminated resource with new oxidizing agent thereby ensuring thorough oxidation of the contaminant (see paragraphs 6 and 27). It would have been obvious to have modified the method of Gallo so as to have included the step of removing the oxidizing agent as suggested by Rhee in order to permit continuous contact of the contaminated resource with new oxidizing agent to ensure thorough oxidation of the contaminant.

Concerning claims 8 and 9, Gallo discloses the oxidizing agent as being introduced as an aqueous solution.

Regarding claims 10-11, Rhee discloses a pressure reducing device in the form of a pump 16.

As to claims 41 and 42, Gallo discloses introducing the oxidizing agent as an aqueous solution and Rhee teaches removing the solution after treatment.

Concerning claims 43 and 44, both Rhee discloses a pressure reducing device in the form of a pump 16.

With respect to claims 14 and 47, Gallo fails to specify the boundary as defining a volume. Rhee discloses a boundary 32 defining a volume and suggests that such an arrangement restricts a vacuum source a particular area. It would have been obvious to have modified the method of Gallo so as to have included the boundary as suggested by Rhee in order to restrict the vacuum force to a specific area.

With respect to claims 21 and 54, Gallo fails to specify placing an impermeable material adjacent to the resource. Rhee discloses placing an impermeable material 32 adjacent the resource and suggests that such an arrangement restricts a vacuum source a particular area. It would have been obvious to have modified the method of Gallo so as to have included the impermeable material as suggested by Rhee in order to restrict the vacuum force to a specific area.

Concerning claims 22 and 54, Rhee discloses placing a semipermeable 30 material between the impermeable material and the resource.

Claims 24, 26-28, and 31-33 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest:

The instantly claimed relation of the transducer body having a top coupled to the body first open end and a bottom adaptively coupled to the body second open end as recited in claim 24;

The instantly claimed relation of the container including a cylinder having an open end and a cap for coupling to the open end as recited in claim 26;

Claims 27 and 28 depend from claim 26 and meet the criteria set out in PCT Article 33(2)-(3) for the same reasons as claim 26;

The instantly claimed relation of the oxidizing agent introducing agent including a impermeable material and inlets and a semipermeable material between a least a part of a batch contaminated resource boundary and the impermeable material as recited in instant claim 31;

Claims 32 and 33 depend from claim 31 and meet the criteria set out in PCT Article 33(2)-(3) for the same reasons as claim 31.